האוניברסיטה העברית בירושלים
The Hebrew University of Jerusalem

המחלקה לכלכלה חקלאית ומנהל
The Department of Agricultural Economics and Management

המרכז למחקר בכלכלה חקלאית
The Center for Agricultural Economic Research

Discussion Paper No. 1.11

Long-Run Trends in the Farm Size Distribution in Israel: The Role of Part-Time Farming

by

Ayal Kimhi and Nitzan Tsur

Papers by members of the Department can be found in their home sites:

מאמרים של חברי המחלקה נמצאים גם באתרי הבית שלהם:

http://departments.agri.huji.ac.il/economics/indexe.html

P.O. Box 12, Rehovot 76100

ת.ד. 12, רחובות 76100

Long-Run Trends in the Farm Size Distribution in Israel: The Role of Part-Time Farming

by

Ayal Kimhi and Nitzan Tzur*

January 2011

Abstract

This article proposes a nonparametric analysis in which the change in the distribution of farm size between two periods is decomposed into several components, and the contributions of subgroups of farms to this change are analyzed. Using data on Israeli family farms, we analyze the changes in the farm size distribution in two separate time periods that are characterized by very different market conditions, focusing on the different contributions of full-time farms and part-time farms to the overall distributional changes. We find that between 1971 and 1981, a period characterized by stability and prosperity, the farm size distribution has shifted to the right with relatively minor changes in higher moments of the distribution. On the other hand, between 1981 and 1995, a largely unfavorable period to Israeli farmers, the change in the distribution was much more complex. While the overall change in the size distribution of farms was smaller in magnitude than in the earlier period, higher moments of the distribution were not less important than the increase in the mean. Between 1971 and 1981 the contributions of full-time farms and part-time farms to the change in the size distribution are quite similar. Between 1981 and 1995, however, full time farms contributed mostly to the growth in the average farm size, while average farm size among part-time farms actually decreased, and their contribution to the variance of farm size was quantitatively larger.

---

* Ayal Kimhi (kimhi@agri.huji.ac.il) is Associate Professor at the Department of Agricultural Economics and Management of the Hebrew University, Director of Research of the Center for Agricultural Economic Research, and Deputy Director of the Taub Center for Social Policy Studies in Israel. Nitzan Tzur is a former graduate student. This research was supported by a grant from the Center for Agricultural Economic Research.

Introduction

A well-known stylized fact in agricultural economics is that the number of farms in developed economies declines over time while the size of the average farm increases. These trends have been documented and analyzed for the U.S. (e.g., Huffman and Evenson 2001; Ahearn *et al.* 2005; Key and Roberts 2007), Canada (Shapiro *et al.* 1987), Britain (Upton and Haworth 1987), Austria (Weiss 1999), The Netherlands (Bremmer *et al.* 2002), Hungary (Rizov and Mathijs 2003; Bakucs and Fertő 2009), Slovenia (Juvančič 2005), and Israel (Ahituv and Kimhi 2006; Dolev and Kimhi 2010), among other countries. The existing literature has used various regression specifications to estimate the determinants of average farm size. Some of the applications allowed farm growth to depend on initial farm size, thereby allowing for differential growth rates for farms of different sizes. The results show trends of increased concentration of farm sizes in several cases and trends of increased dispersion of farm sizes in other cases, while in some other cases no significant effect of farm size on farm growth was found.

The limitation of this line of literature is the reliance on a parametric regression model that allows for a limited class of distributional changes. Two alternatives have been proposed in the literature. Chavas and Magand (1988) and Zepeda (1995) used a Markov analysis to estimate transition probabilities between size classes. Alternatively, Kostov *et al.* (2005) and Bakucs and Fertő (2009) estimated the farm growth equation by quantile regression, thereby allowing different growth rates in different parts of the size distribution. These methods allow for more flexible changes in farm growth rates across the farm size distribution. Still, they do not capture the entire change in the farm size distribution over time.

The purpose of this article is to propose a method for examining the changes over time of the entire farm size distribution, and to identify determinants of these changes. Wolf and Sumner (2001) looked at the changes in the farm size distribution using kernel density

estimates, but did not go further than a visual inspection of the density plots. We take this approach a step further. Our proposed method analyzes the changes in the size distribution of farms by decomposing the change in the density function into changes in subgroup shares and changes in subgroup densities, after dividing the farm population into subgroups according to some key characteristics. The changes in subgroup densities are decomposed further, as suggested by Jenkins and van Kerm (2005), into changes in the location (mean), spread (variance), and higher moments of the distribution. This allows the identification of types of farms that contribute to the changes in the farm size distributions in specific ways. This approach is nonparametric in nature, and is superior to regression-based parametric approaches, such as the one proposed by Miljkovic (2005), who used a regression framework to analyze the determinants of an index of farm size inequality. Several semiparametric alternatives have been proposed in the literature. For example, Melly (2005) uses a quantile regression in order to decompose inequality into the share of covariates, the share of coefficients and the share of residuals. This allows for a richer set of covariates than the Jenkins and van Kerm (2005) procedure, but it relies on a parametric assumption about the dependence of conditional quantiles on the covariates.

We choose to divide the sample into two subgroups: full-time farms and part-time farms. A full-time (part-time) farm is a farm whose operator does not work (works) off the farm. Separating the sample into full-time and part-time farms enables to examine the interaction between farm type and the change in the farm size distribution. Previous research has shown that off-farm work is one of the most important determinants of farm growth (Ahituv and Kimhi 2006; Upton and Haworth 1987; Weiss 1999).

We use cross-sectional data on Israeli family farms for three different time periods. The first two are derived from the two recent Censuses of Agriculture, 1971 and 1981, which include the entire population of farm households. The third data source is the 1995 farm

survey, covering about 10% of the population. All three data collection efforts were conducted by the Central Bureau of Statistics in Israel. We focus on family farms in cooperative villages (*Moshavim*), because for these we have the most detailed information. Using data from three periods allows us to analyze the changes in the farm size distribution in two sub-periods: 1971-81 and 1981-95. This is particularly important in the case of Israel, since the 1970s were a relatively stable and favorable period for Israeli farmers, while the latter period was characterized by much turmoil, including high inflation, a debt crisis, and hired labor shortages due to security issues. Therefore, we expect quite different trends in the farm size distribution in these two sub-periods. Figure 1 confirms this expectation. The top panel presents the kernel density plots of farm size distributions in the three time periods. While the change from 1971 to 1981 seems to be mostly an increase in the average farm size, the change from 1981 to 1995 involves both an increase in the average farm size and an increase in the variance of farm size. The two other panels in figure 1 present the kernel density plots of full-time farms and part-time farms, respectively. It can be seen that the increase in mean farm size between 1981 and 1995 is entirely due to full-time farms, while the increase in farm size inequality between those years is mostly due to part-time farms. Since the fraction of part-time farms went down from 44% in 1971 to 37% in 1981 and 28% in 1995, the changes in the farm size distribution could be rooted in the intensive margin and/or in the extensive margin. In the empirical section of this paper, we will further decompose the distributional changes and assess their relation to the full-time/part-time dichotomy.

In the next section we present the density decomposition methodology. After that we provide a more detailed description of the data we use and the measurement of farm size. Then we present the decomposition results. The final section summarizes the findings.

Methodology

Suppose that the farm population can be divided into K different subgroups indexed 1…*K*.[1] The density function of the farm size distribution can be written as:

$$(1) \qquad f(x) = \sum_{k=1}^{K} v^k \cdot f^k(x),$$

where $f(x)$ is the density function of farm size (x) over the entire farm population, v^k is the population share of subgroup k, and $f^k(x)$ is the density function of farm size within subgroup k. In addition, the change in the density function between time period 0 and time period 1 can be written as:

$$(2) \qquad \Delta f(x) = \sum_{k=1}^{K} w^k \Delta f^k(x) + \sum_{k=1}^{K} z^k(x) \Delta v^k = c_D(x) + c_S(x),$$

where $c_D(x)$ is the contribution of the changes in subgroup densities, $c_S(x)$ is the contribution of the changes in the subgroup shares, and the weights w^k and $z^k(x)$ are defined as:

$$(3) \qquad w^k = \pi \cdot v_0^k + (1-\pi) \cdot v_1^k$$

$$(4) \qquad z^k(x) = (1-\pi) \cdot f_0^k(x) + \pi \cdot f_1^k(x)$$

where $0 \leq \pi \leq 1$ can be chosen arbitrarily. In our application we use $\pi = 0.5$.

Following Jenkins and van Kerm (2005), we now move to further decompose the change in subgroup densities $c_D(x)$ into three components: sliding, stretching and squashing.

[1] This section draws heavily on Jenkins and van Kerm (2005).

Sliding reflects a horizontal shift of the entire density function. Stretching reflects an increase in the spread of the density without changing the mean. Squashing reflects all other changes in the density function, holding the mean and the spread constant. We begin by assuming the existence of a subgroup-specific function (g_k) that describes end-period farm size (x_1) as a function of beginning-period farm size (x_0): $x_1 = g_k(x_0)$. Using the inverse of g_k, we can express the end-period density as:

$$(5) \qquad f_1^k(x) = \left| \frac{d(g_k^{-1}(x)}{dx} \right| f_0^k(g_k^{-1}(x)) .$$

By using specific functional forms for g_k, we can construct specific approximations of the changes in the farm size density. For example, suppose that we choose a linear function:

$$(6) \qquad x_1 = \alpha_k + \beta_k x_0 .$$

Under the linearily assumption, our approximation for the farm size density is:

$$(7) \qquad \varsigma^k(x) = \left| \frac{1}{\beta_k} \right| f_0^k(\frac{x - \alpha_k}{\beta_k}) .$$

Now suppose that we impose the constraint $\beta_k = 1$. The linear transformation g_k now reflects an additive increase of a constant number of units, α_k, in the size of all farms in subgroup k. In terms of the density function, this is reflected in a horizontal shift of the entire function, which is denoted as sliding. Calibrating to the increase in average farm size, we obtain $\alpha_k = E(f_1^k) - E(f_0^k)$. Using these parameters, (7) is now denoted $\varsigma_1^k(x; \mu_1^k, \sigma_0^k)$, where the

subscript "0" of the standard deviation means that we keep the spread of the initial period, and the subscript "1" of the mean of the distribution means that the approximated distribution has the same mean as the actual distribution in the final period.

We now move to an alternative parameterization of (6): $\beta_k = s,\ \alpha_k = (1-s)E(f_0^k)$. It is easy to verify that this transformation does not change the mean of farm size, but increases the standard deviation by a factor of s. Hence, the calibration to the final-period standard deviation requires setting $s = \sqrt{Var(f_1^k)/Var(f_0^k)}$. Using these parameters, (7) is now denoted $\varsigma_1^k(x;\mu_0^k,\sigma_1^k)$, where the subscript "0" of the mean of the distribution means that we keep the mean of the initial period, and the subscript "1" of the standard deviation means that the approximated distribution has the same standard deviation as the actual distribution in the final period.

We can also merge these two transformations into a single transformation that allows changes in both mean and standard deviation. Calibration to final-period mean and standard deviation requires setting $\beta_k = s = \sqrt{Var(f_1^k)/Var(f_0^k)}$ and $\alpha_k = E(f_1^k) - E(f_0^k)$. The resulting approximated density based on (7) is denoted as $\varsigma_1^k(x;\mu_1^k,\sigma_1^k)$. We are now in the position to decompose the change in the subgroup density function of farm size into the three components: sliding, stretching and squashing. Note that both sliding and stretching can be obtained in two ways. Sliding, for example, is the change in the mean, but it can be conditioned on the standard deviation of either the initial period or the final period. Similarly, stretching is the change in the standard deviation, but it can be conditioned on the mean of the initial period or the final period. We solve this problem by weighting each of these possibilities in a way that leaves squashing as a residual. The resulting decomposition is:

$$
\begin{aligned}
\Delta f^k(x) = {} & \eta(\varsigma_1^k(x;\mu_1^k,\sigma_0^k) - f_0^k(x)) + (1-\eta)(\varsigma_1^k(x;\mu_1^k,\sigma_1^k) - \varsigma_1^k(x;\mu_0^k,\sigma_1^k)) \\
& \text{[Subgroup mean effect (sliding)]} \\
& + \eta(\varsigma_1^k(x;\mu_1^k,\sigma_1^k) - \varsigma(x;\mu_1^k,\sigma_0^k)) + (1-\eta)(\varsigma_1^k(x;\mu_0^k,\sigma_1^k) - f_0^k(x)) \\
& \text{[Subgroup variance effect (streching)]} \\
& + f_1^k(x) - \varsigma_1^k(x;\mu_1^k,\sigma_1^k) \\
& \text{[Subgroup residual effect (squashing)]}
\end{aligned} \tag{8}
$$

The weight η is set at 0.5 in the empirical analysis. Once computed, (8) can be plugged into (2) to obtain the overall decomposition.

Data

The 1971 Israeli Census of Agriculture data set includes 19,147 observations on family farms in cooperative villages, while the 1981 Census data set includes 18,614. The 1995 representative farm survey covered 2,049 farms, representing a population of 15,546 farms. This latter survey focused on active farms, and hence only farms with annual value added of more than NIS3,000 were included. Therefore, we trimmed the 1971 and 1981 samples accordingly, with thresholds that reflect the changes in the consumer price index. The resulting number of farms in 1971 and 1981, are, respectively, 19,005 and 18,499.

We measure farm size by the real value of output. This is the simplest measure that was available for all three periods. The value of output is computed "normatively", in a way that is similar to the computation of Standard Gross Margin by the European Commission. Specifically, for each type of crop or livestock, the plot size or the number of livestock is multiplied by an average coefficient of output, derived from specific field surveys, that varies only by geographic location. In this sense this normative measure of output reflects the volume of inputs used on the farm and the choice of output portfolio rather than actual output. In particular, it does not reflect individual farm productivity or price heterogeneity. Hence, it can legitimately be considered a measure of farm size. This is particularly important because

most family farms in Israel are diversified, and therefore simpler measures of size such as operated land or number of livestock are not adequate. We would have preferred to use value added rather than output to measure farm size (Lund 1983), but unfortunately value added was not computed in the 1971 census. We did repeat the 1981-1995 decomposition using value added instead of value of output, and the results were quite similar.

Decomposition results

In this section we apply the decomposition methodology described above to the case of changes in the farm size distribution in Israel. Figure 2 shows the decomposition of the changes in the farm size distribution, for the two sub-periods, 1971-81 and 1981-95. The top panel shows the total change in the distribution. The total change is a simple vertical subtraction of the initial-period density function from the end-period density function. For both sub-periods, the top panel indicates that the farm size distribution has shifted to the right: relatively small farm sizes show mostly negative values while relatively large farm sizes show mostly positive values. This is just a replication of what we saw in figure 1.[2]

The remaining panels show the relative importance of the different components of the distributional changes, in each sub-period. The first observation is that the component of the share of each subgroup in the farm population is negligible. This implies that farm size transitions are driven by factors other than farms changing from full-time to part-time or the other way around. Secondly, we can see that between 1971 and 1981 the sliding component is very similar in shape to the overall change, indicating that the remaining components are relatively not important as a set. Specifically, we can see that the stretching component and the squashing component have considerably lower magnitudes compared to the sliding

[2] Note that the vertical scales of the 1971-81 and 1981-95 graphs are not identical, and hence the changes in 1981-95 are smaller in magnitude than the changes in 1971-81.

component, and they also effectively cancel each other in most ranges of the farm size distribution.

The situation is different in the case of the farm size distribution change between 1981 and 1995. Here, the magnitudes of the sliding, stretching and squashing components are not very different from each other. While the sliding component still indicates that farms got larger on average, the stretching and squashing components indicate that a non-negligible number of farms actually got smaller. This is similar to the conclusions of Dolev and Kimhi (2010). Hence, the phenomenon of the "disappearing middle" of the farm size distribution was much more important during the 1980s and beginning of the 1990s than during the 1970s.

Figures 3 and 4 separate the components of the decomposition into the contributions of full-time farms and part-time farms. In figure 3 we can see that the dominant sliding components of the distributional change between 1971 and 1981 are not very different for full-time and part-time farms, although for part-time farms the changes due to sliding seem to be spread relatively more evenly along the range of farm sizes. The same is true for the stretching components. However, in figure 4 we can see that the different components of the distributional changes between 1981 and 1995 are quite different among full-time and part-time farms. In particular, the top panel shows that while among full-time farms it is quite clear that the entire size distribution has shifted to the right, we observe a "disappearing middle" among part-time farms, i.e., the size distribution of part-time farms became flatter between 1981 and 1995, confirming our earlier conclusion from figure 1.

Conclusion

Analyses of changes in farm size distributions should be based on minimal distributional assumptions. This article proposes a nonparametric analysis in which the change in the distribution between two periods is decomposed into sliding, stretching and

squashing components, as well as a subgroup component if the farm population is broken down to several subgroups. We apply this method to the case of Israeli family farms, and analyze the changes in the farm size distribution in two separate time periods that are characterized by very different market conditions. In particular, we focus on the different contributions of full-time farms and part-time farms to the overall distributional changes.

Our analysis shows that between 1971 and 1981, a period characterized by stability and prosperity of the Israeli farm sector, the change in the farm size distribution is almost entirely attributed to the sliding component, i.e., the whole distribution has shifted to the right with relatively minor changes in higher moments of the distribution. In addition, the difference between the contributions of full-time farms and part-time farms to the change in the size distribution is quite small.

The change in the distribution between 1981 and 1995 was much different. This period was unfavorable to Israeli farmers, with sharp changes in the economic and institutional environment. It is not surprising that the change in the distribution was much more complex than in the earlier period. In particular, while the overall change in the size distribution of farms was smaller in magnitude, higher moments of the distribution were not less important than the sliding component. In addition, full-time and part-time farms contributed quite differently to the change in the farm size distribution, with full time farms contributing mostly to the growth in the average farm size, while average farm size among part-time farms actually decreased, and their contribution to the variance of farm size was quantitatively larger.

The method proposed in this article was proved to be quite useful, but it is still limited in its ability to examine multiple determinants of the distributional change. Of course, one can separate the sample into multiple subgroups that reflect more than one determinant, but this still falls short of a complete multivariate analysis. This issue is left for further research.

References

Ahearn, Mary Clare, Jet Yee, and Penni Korb (2005). "Effects of Differing Farm Policies on Farm Structure and Dynamics." *American Journal of Agricultural Economics* 87: 1182-1189.

Ahituv, Avner, and Ayal Kimhi (2006). "Simultaneous Estimation of Work Choices and the Level of Farm Activity Using Panel Data. *European Review of Agricultural Economics* 33: 49-71.

Bakucs, Lajos Zoltán, and Imre Fertő (2009). "The Growth of Family Farms in Hungary." *Agricultural Economics* 40: 789-795.

Bremmer, Johan, Alfons G.J.M. Oude Lansink, Kent D. Olson, Willy H.M. Baltussen, and Ruud B.M. Huirne (2002). *Analysis of Farm Development in Dutch Agriculture and Horticulture*. Paper Presented at the 13th Congress of the International Farm Management Association (IFMA), Wageningen, The Netherlands.

Chavas, Jean-Paul, and Gilbert Magand (1988). "A Dynamic Analysis of the Size Distribution of Firms: The Case of the US Dairy Industry." *Agribusiness* 4: 315-329.

Dolev, Yuval, and Ayal Kimhi (2010). "Do Family Farms Really Converge to a Uniform Size? The Role of Unobserved Farm Efficiency." *Australian Journal of Agricultural and Resource Economics* 54: 119-136.

Huffman, Wallace E., and Robert E. Evenson (2001). "Structural and Productivity Change in US Agriculture, 1950-1982." *Agricultural Economics* 24: 127-147.

Juvančič, Luka (2005). "Characteristics of Structural Adjustment of Agricultural Holdings in Slovenia." *Jahrbuch der Österreichischen Gesellschaft für Agrarökonomie* 13: 311-329.

Jenkins, Stephen P., and Philippe van Kerm (2005). "Accounting for Income Distribution Trends: A Density Function Decomposition Approach." *Journal of Income Distribution* 3: 43-61.

Key, Nigel D., and Michael J. Roberts (2007). "Do Government Payments Influence Farm Size and Survival?" *Journal of Agricultural and Resource Economics* 32: 330-349.

Kostov, Philip, Miles Patton, Joan Moss, and Seamus McErlean (2005). *Does Gibrat's Law Hold Amongst Dairy Farmers in Northern Ireland?* Paper Presented at the XIth Congress of The European Association of Agricultural Economists, Copenhagen, Denmark.

Lund, Philip J. (1983). "The Use of Alternative Measures of Farm Size in Analyzing the Size and Efficiency Relationship." *Journal of Agricultural Economics* 34: 185-192.

Melly, Blaise (2005). "Decomposition of Differences in Distribution Using Quantile Regression." *Labour Economics* 12: 577-590.

Miljkovic, Dragan (2005). "Measuring and Causes of Inequality in Farm Sizes in the United States." *Agricultural Economics* 33: 21-27.

Rizov, Marian, and Erik Mathijs (2003). "Farm Survival and Growth in Transition Economies: Theory and Empirical Evidence from Hungary. *Post-Communist Economies* 15: 227-242.

Shapiro, Daniel, Ray D. Bollman, and Philip Ehrensaft (1987). "Farm Size and Growth in Canada, *American Journal of Agricultural Economics* 69: 477-483.

Upton, Martin, and Simon Haworth (1987). "The Growth of Farms." *European Review of Agricultural Economics* 14: 351-366.

Weiss, Christoph R. (1999). "Farm Growth and Survival: Econometric Evidence for Individual Farms in Upper Austria." *American Journal of Agricultural Economics* 81: 103-16.

Wolf, Christopher A. and Daniel A. Sumner (2001). "Are Farm Size Distributions Bimodal? Evidence from Kernel Density Estimates of Dairy Farm Size Distributions." *American Journal of Agricultural Economics* 83: 77-88.

Zepeda, Lydia (1995). "Asymmetry and Nonstationarity in the Farm Size Distribution of Wisconsin Milk Producers: An Aggregate Analysis.: *American Journal of Agricultural Economics* 77: 837-852.

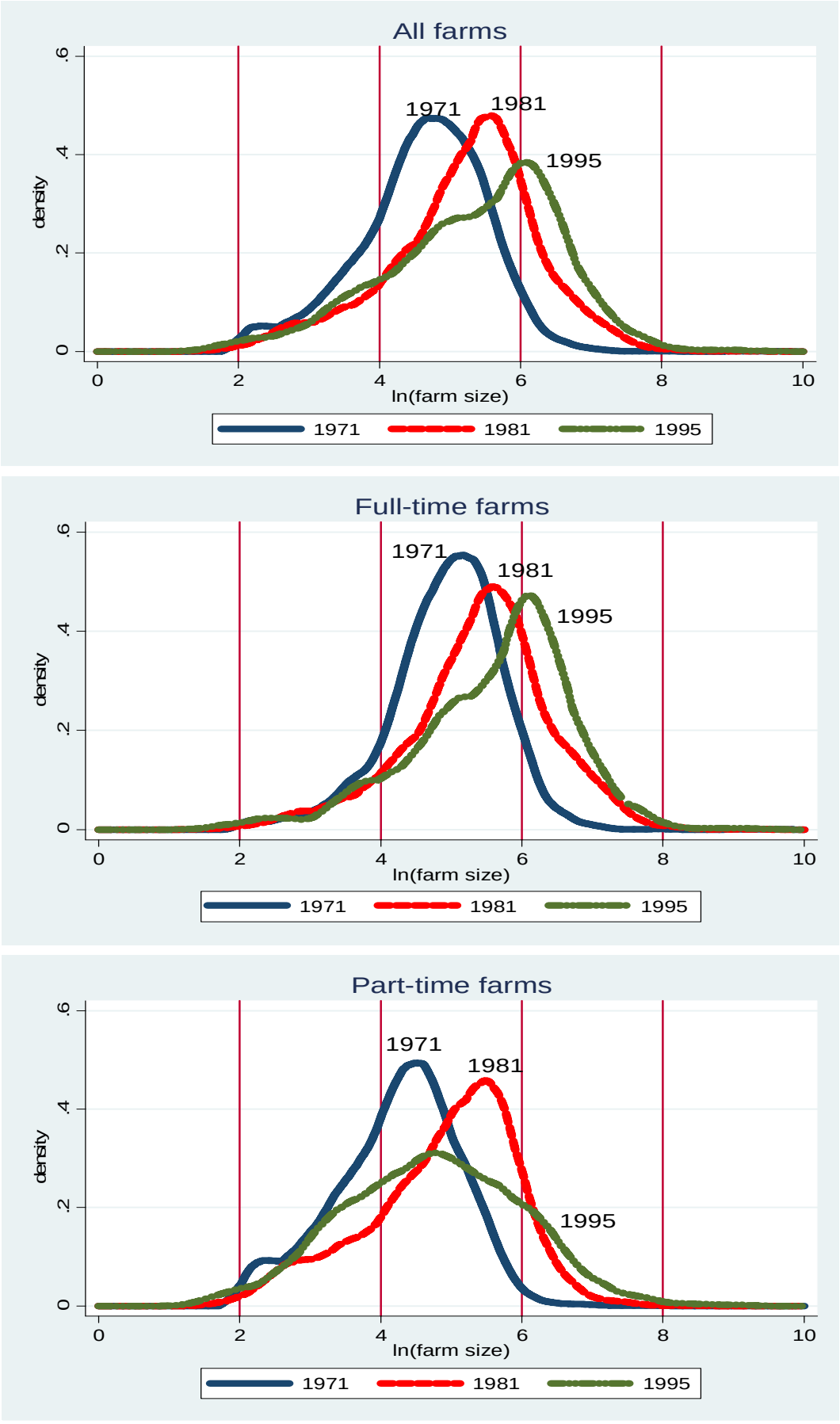

Figure 1. Changes in the farm size distribution by full-time/part-time status

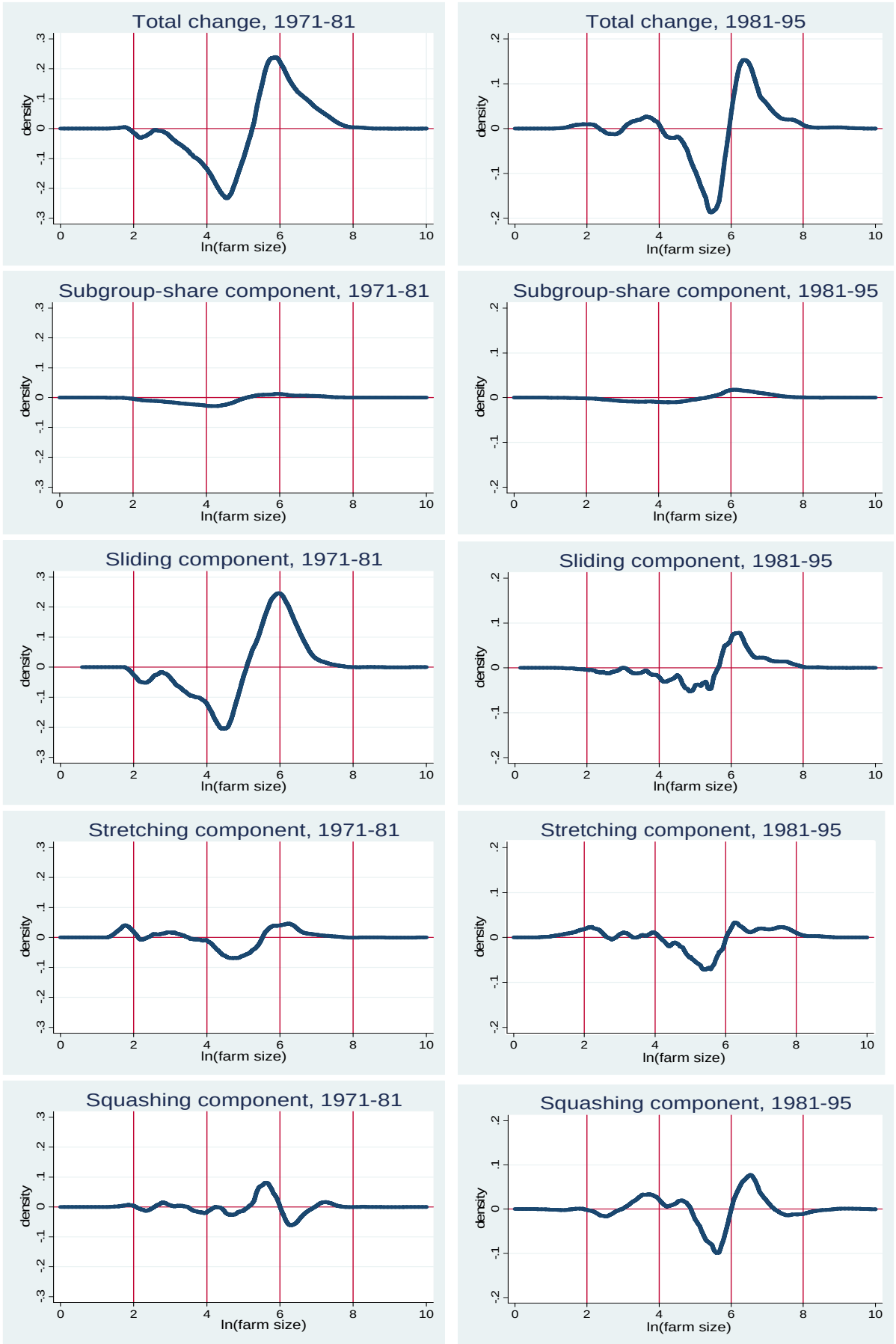

Figure 2. Decomposition of changes in farm size distribution, 1971-81 and 1981-95

Figure 3. Decomposition of changes in farm size distribution, 1971-81

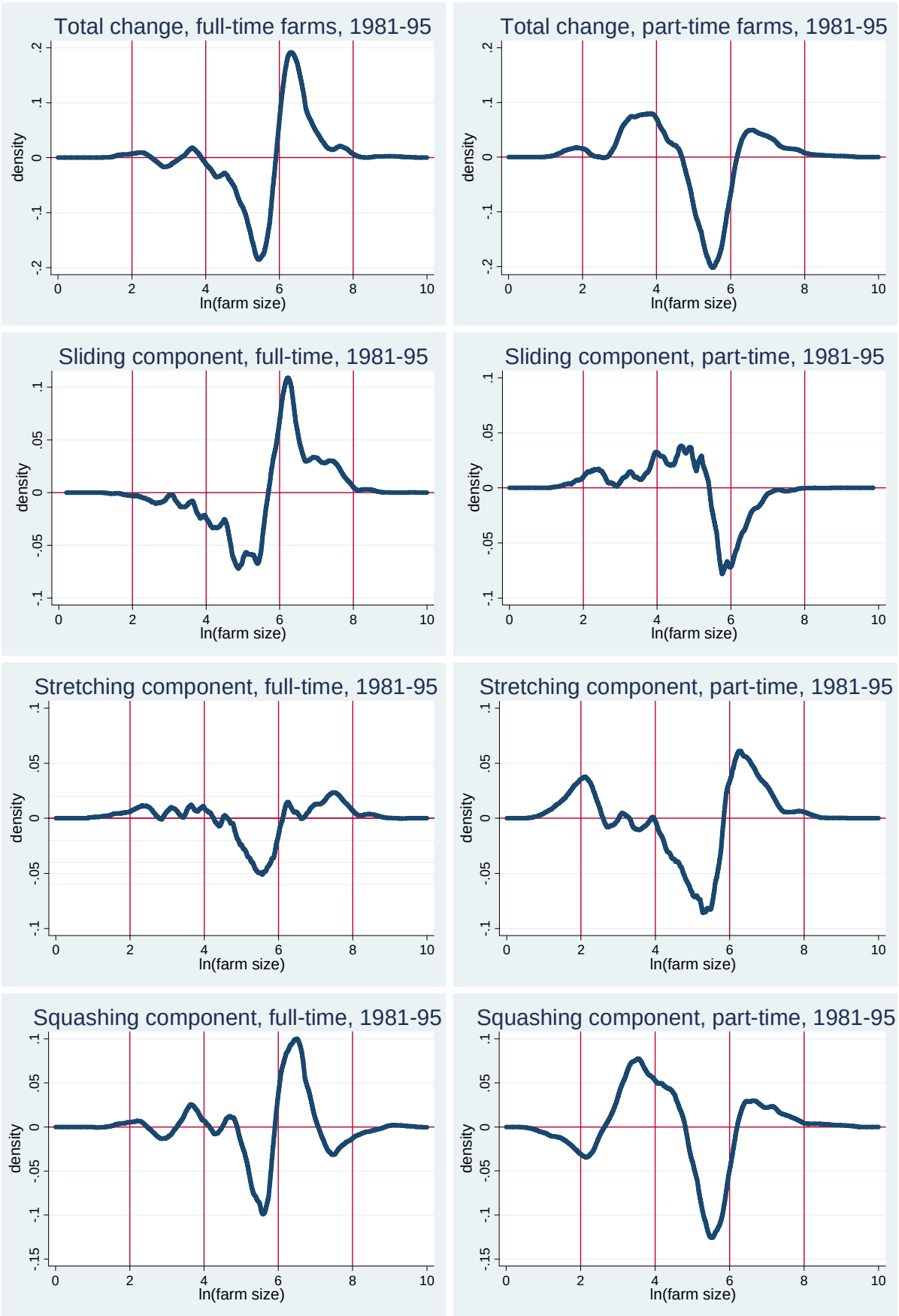

Figure 4. Decomposition of changes in farm size distribution, 1981-95

PREVIOUS DISCUSSION PAPERS

1.01 Yoav Kislev - Water Markets (Hebrew).

2.01 Or Goldfarb and Yoav Kislev - Incorporating Uncertainty in Water Management (Hebrew).

3.01 Zvi Lerman, Yoav Kislev, Alon Kriss and David Biton - Agricultural Output and Productivity in the Former Soviet Republics.

4.01 Jonathan Lipow & Yakir Plessner - The Identification of Enemy Intentions through Observation of Long Lead-Time Military Preparations.

5.01 Csaba Csaki & Zvi Lerman - Land Reform and Farm Restructuring in Moldova: A Real Breakthrough?

6.01 Zvi Lerman - Perspectives on Future Research in Central and Eastern European Transition Agriculture.

7.01 Zvi Lerman - A Decade of Land Reform and Farm Restructuring: What Russia Can Learn from the World Experience.

8.01 Zvi Lerman - Institutions and Technologies for Subsistence Agriculture: How to Increase Commercialization.

9.01 Yoav Kislev & Evgeniya Vaksin - The Water Economy of Israel--An Illustrated Review. (Hebrew).

10.01 Csaba Csaki & Zvi Lerman - Land and Farm Structure in Poland.

11.01 Yoav Kislev - The Water Economy of Israel.

12.01 Or Goldfarb and Yoav Kislev - Water Management in Israel: Rules vs. Discretion.

1.02 Or Goldfarb and Yoav Kislev - A Sustainable Salt Regime in the Coastal Aquifer (Hebrew).

2.02 Aliza Fleischer and Yacov Tsur - Measuring the Recreational Value of Open Spaces.

3.02 Yair Mundlak, Donald F. Larson and Rita Butzer - Determinants of Agricultural Growth in Thailand, Indonesia and The Philippines.

4.02 Yacov Tsur and Amos Zemel - Growth, Scarcity and R&D.

5.02 Ayal Kimhi - Socio-Economic Determinants of Health and Physical Fitness in Southern Ethiopia.

6.02 Yoav Kislev - Urban Water in Israel.

7.02 Yoav Kislev - A Lecture: Prices of Water in the Time of Desalination. (Hebrew).

8.02 Yacov Tsur and Amos Zemel - On Knowledge-Based Economic Growth.

9.02 Yacov Tsur and Amos Zemel - Endangered aquifers: Groundwater management under threats of catastrophic events.

10.02 Uri Shani, Yacov Tsur and Amos Zemel - Optimal Dynamic Irrigation Schemes.

1.03 Yoav Kislev - The Reform in the Prices of Water for Agriculture (Hebrew).

2.03 Yair Mundlak - Economic growth: Lessons from two centuries of American Agriculture.

3.03 Yoav Kislev - Sub-Optimal Allocation of Fresh Water. (Hebrew).

4.03 Dirk J. Bezemer & Zvi Lerman - Rural Livelihoods in Armenia.

5.03 Catherine Benjamin and Ayal Kimhi - Farm Work, Off-Farm Work, and Hired Farm Labor: Estimating a Discrete-Choice Model of French Farm Couples' Labor Decisions.

6.03 Eli Feinerman, Israel Finkelshtain and Iddo Kan - On a Political Solution to the Nimby Conflict.

7.03 Arthur Fishman and Avi Simhon - Can Income Equality Increase Competitiveness?

8.03 Zvika Neeman, Daniele Paserman and Avi Simhon - Corruption and Openness.

9.03 Eric D. Gould, Omer Moav and Avi Simhon - The Mystery of Monogamy.

10.03 Ayal Kimhi - Plot Size and Maize Productivity in Zambia: The Inverse Relationship Re-examined.

11.03 Zvi Lerman and Ivan Stanchin - New Contract Arrangements in Turkmen Agriculture: Impacts on Productivity and Rural Incomes.

12.03 Yoav Kislev and Evgeniya Vaksin - Statistical Atlas of Agriculture in Israel - 2003-Update (Hebrew).

1.04 Sanjaya DeSilva, Robert E. Evenson, Ayal Kimhi - Labor Supervision and Transaction Costs: Evidence from Bicol Rice Farms.

2.04 Ayal Kimhi - Economic Well-Being in Rural Communities in Israel.

3.04 Ayal Kimhi - The Role of Agriculture in Rural Well-Being in Israel.

4.04 Ayal Kimhi - Gender Differences in Health and Nutrition in Southern Ethiopia.

5.04 Aliza Fleischer and Yacov Tsur - The Amenity Value of Agricultural Landscape and Rural-Urban Land Allocation.

6.04 Yacov Tsur and Amos Zemel – Resource Exploitation, Biodiversity and Ecological Events.

7.04 Yacov Tsur and Amos Zemel – Knowledge Spillover, Learning Incentives And Economic Growth.

8.04 Ayal Kimhi – Growth, Inequality and Labor Markets in LDCs: A Survey.

9.04 Ayal Kimhi – Gender and Intrahousehold Food Allocation in Southern Ethiopia

10.04 Yael Kachel, Yoav Kislev & Israel Finkelshtain – Equilibrium Contracts in The Israeli Citrus Industry.

11.04 Zvi Lerman, Csaba Csaki & Gershon Feder – Evolving Farm Structures and Land Use Patterns in Former Socialist Countries.

12.04 Margarita Grazhdaninova and Zvi Lerman – Allocative and Technical Efficiency of Corporate Farms.

13.04 Ruerd Ruben and Zvi Lerman – Why Nicaraguan Peasants Stay in Agricultural Production Cooperatives.

14.04 William M. Liefert, Zvi Lerman, Bruce Gardner and Eugenia Serova - Agricultural Labor in Russia: Efficiency and Profitability.

1.05 Yacov Tsur and Amos Zemel – Resource Exploitation, Biodiversity Loss and Ecological Events.

2.05 Zvi Lerman and Natalya Shagaida – Land Reform and Development of Agricultural Land Markets in Russia.

3.05 Ziv Bar-Shira, Israel Finkelshtain and Avi Simhon – Regulating Irrigation via Block-Rate Pricing: An Econometric Analysis.

4.05 Yacov Tsur and Amos Zemel – Welfare Measurement under Threats of Environmental Catastrophes.

5.05 Avner Ahituv and Ayal Kimhi – The Joint Dynamics of Off-Farm Employment and the Level of Farm Activity.

6.05 Aliza Fleischer and Marcelo Sternberg – The Economic Impact of Global Climate Change on Mediterranean Rangeland Ecosystems: A Space-for-Time Approach.

7.05 Yael Kachel and Israel Finkelshtain – Antitrust in the Agricultural Sector: A Comparative Review of Legislation in Israel, the United States and the European Union.

8.05 Zvi Lerman – Farm Fragmentation and Productivity Evidence from Georgia.

9.05 Zvi Lerman – The Impact of Land Reform on Rural Household Incomes in Transcaucasia and Central Asia.

10.05 Zvi Lerman and Dragos Cimpoies – Land Consolidation as a Factor for Successful Development of Agriculture in Moldova.

11.05 Rimma Glukhikh, Zvi Lerman and Moshe Schwartz – Vulnerability and Risk Management among Turkmen Leaseholders.

12.05 R.Glukhikh, M. Schwartz, and Z. Lerman – Turkmenistan's New Private Farmers: The Effect of Human Capital on Performance.

13.05 Ayal Kimhi and Hila Rekah – The Simultaneous Evolution of Farm Size and Specialization: Dynamic Panel Data Evidence from Israeli Farm Communities.

14.05 Jonathan Lipow and Yakir Plessner - Death (Machines) and Taxes.

1.06 Yacov Tsur and Amos Zemel – Regulating Environmental Threats.

2.06 Yacov Tsur and Amos Zemel - Endogenous Recombinant Growth.

3.06 Yuval Dolev and Ayal Kimhi – Survival and Growth of Family Farms in Israel: 1971-1995.

4.06 Saul Lach, Yaacov Ritov and Avi Simhon – Longevity across Generations.

5.06 Anat Tchetchik, Aliza Fleischer and Israel Finkelshtain – Differentiation & Synergies in Rural Tourism: Evidence from Israel.

6.06 Israel Finkelshtain and Yael Kachel – The Organization of Agricultural Exports: Lessons from Reforms in Israel.

7.06 Zvi Lerman, David Sedik, Nikolai Pugachev and Aleksandr Goncharuk – Ukraine after 2000: A Fundamental Change in Land and Farm Policy?

8.06 Zvi Lerman and William R. Sutton – Productivity and Efficiency of Small and Large Farms in Moldova.

9.06 Bruce Gardner and Zvi Lerman – Agricultural Cooperative Enterprise in the Transition from Socialist Collective Farming.

10.06 Zvi Lerman and Dragos Cimpoies - Duality of Farm Structure in Transition Agriculture: The Case of Moldova.

11.06 Yael Kachel and Israel Finkelshtain – Economic Analysis of Cooperation In Fish Marketing. (Hebrew)

12.06 Anat Tchetchik, Aliza Fleischer and Israel Finkelshtain – Rural Tourism: Developmelnt, Public Intervention and Lessons from the Israeli Experience.

13.06 Gregory Brock, Margarita Grazhdaninova, Zvi Lerman, and Vasilii Uzun - Technical Efficiency in Russian Agriculture.

14.06 Amir Heiman and Oded Lowengart - Ostrich or a Leopard – Communication Response Strategies to Post-Exposure of Negative Information about Health Hazards in Foods

15.06 Ayal Kimhi and Ofir D. Rubin – Assessing the Response of Farm Households to Dairy Policy Reform in Israel.

16.06 Iddo Kan, Ayal Kimhi and Zvi Lerman – Farm Output, Non-Farm Income, and Commercialization in Rural Georgia.

17.06 Aliza Fleishcer and Judith Rivlin – Quality, Quantity and Time Issues in Demand for Vacations.

1.07 Joseph Gogodze, Iddo Kan and Ayal Kimhi – Land Reform and Rural Well Being in the Republic of Georgia: 1996-2003.

2.07 Uri Shani, Yacov Tsur, Amos Zemel & David Zilberman – Irrigation Production Functions with Water-Capital Substitution.

3.07 Masahiko Gemma and Yacov Tsur – The Stabilization Value of Groundwater and Conjunctive Water Management under Uncertainty.

4.07 Ayal Kimhi – Does Land Reform in Transition Countries Increase Child Labor? Evidence from the Republic of Georgia.

5.07 Larry Karp and Yacov Tsur – Climate Policy When the Distant Future Matters: Catastrophic Events with Hyperbolic Discounting.

6.07 Gilad Axelrad and Eli Feinerman – Regional Planning of Wastewater Reuse for Irrigation and River Rehabilitation.

7.07 Zvi Lerman – Land Reform, Farm Structure, and Agricultural Performance in CIS Countries.

8.07 Ivan Stanchin and Zvi Lerman – Water in Turkmenistan.

9.07 Larry Karp and Yacov Tsur – Discounting and Climate Change Policy.

10.07 Xinshen Diao, Ariel Dinar, Terry Roe and Yacov Tsur – A General Equilibrium Analysis of Conjunctive Ground and Surface Water Use with an Application To Morocco.

11.07 Barry K. Goodwin, Ashok K. Mishra and Ayal Kimhi – Household Time Allocation and Endogenous Farm Structure: Implications for the Design of Agricultural Policies.

12.07 Iddo Kan, Arie Leizarowitz and Yacov Tsur - Dynamic-spatial management of coastal aquifers.

13.07 Yacov Tsur and Amos Zemel – Climate change policy in a growing economy under catastrophic risks.

14.07 Zvi Lerman and David J. Sedik – Productivity and Efficiency of Corporate and Individual Farms in Ukraine.

15.07 Zvi Lerman and David J. Sedik – The Role of Land Markets in Improving Rural Incomes.

16.07 Ayal Kimhi – Regression-Based Inequality Decomposition: A Critical Review And Application to Farm-Household Income Data.

17.07 Ayal Kimhi and Hila Rekah – Are Changes in Farm Size and Labor Allocation Structurally Related? Dynamic Panel Evidence from Israel.

18.07 Larry Karp and Yacov Tsur – Time Perspective, Discounting and Climate Change Policy.

1.08 Yair Mundlak, Rita Butzer and Donald F. Larson – Heterogeneous Technology and Panel Data: The Case of the Agricultural Production Function.

2.08 Zvi Lerman – Tajikistan: An Overview of Land and Farm Structure Reforms.

3.08 Dmitry Zvyagintsev, Olga Shick, Eugenia Serova and Zvi Lerman – Diversification of Rural Incomes and Non-Farm Rural Employment: Evidence from Russia.

4.08 Dragos Cimpoies and Zvi Lerman – Land Policy and Farm Efficiency: The Lessons of Moldova.

5.08 Ayal Kimhi – Has Debt Restructuring Facilitated Structural Transformation on Israeli Family Farms?.

6.08 Yacov Tsur and Amos Zemel – Endogenous Discounting and Climate Policy.

7.08 Zvi Lerman – Agricultural Development in Uzbekistan: The Effect of Ongoing Reforms.

8.08 Iddo Kan, Ofira Ayalon and Roy Federman – Economic Efficiency of Compost Production: The Case of Israel.

9.08 Iddo Kan, David Haim, Mickey Rapoport-Rom and Mordechai Shechter – Environmental Amenities and Optimal Agricultural Land Use: The Case of Israel.

10.08 Goetz, Linde, von Cramon-Taubadel, Stephan and Kachel, Yael - Measuring Price Transmission in the International Fresh Fruit and Vegetable Supply Chain: The Case of Israeli Grapefruit Exports to the EU.

11.08 Yuval Dolev and Ayal Kimhi – Does Farm Size Really Converge? The Role Of Unobserved Farm Efficiency.

12.08 Jonathan Kaminski – Changing Incentives to Sow Cotton for African Farmers: Evidence from the Burkina Faso Reform.

13.08 Jonathan Kaminski – Wealth, Living Standards and Perceptions in a Cotton Economy: Evidence from the Cotton Reform in Burkina Faso.

14.08 Arthur Fishman, Israel Finkelshtain, Avi Simhon & Nira Yacouel – The Economics of Collective Brands.

15.08 Zvi Lerman - Farm Debt in Transition: The Problem and Possible Solutions.

16.08 Zvi Lerman and David Sedik – The Economic Effects of Land Reform in Central Asia: The Case of Tajikistan.

17.08 Ayal Kimhi – Male Income, Female Income, and Household Income Inequality in Israel: A Decomposition Analysis

1.09 Yacov Tsur – On the Theory and Practice of Water Regulation.

2.09 Yacov Tsur and Amos Zemel – Market Structure and the Penetration of Alternative Energy Technologies.

3.09 Ayal Kimhi – Entrepreneurship and Income Inequality in Southern Ethiopia.

4.09 Ayal Kimhi – Revitalizing and Modernizing Smallholder Agriculture for Food Security, Rural Development and Demobilization in a Post-War Country: The Case of the Aldeia Nova Project in Angola.

5.09 Jonathan Kaminski, Derek Headey, and Tanguy Bernard – Institutional Reform in the Burkinabe Cotton Sector and its Impacts on Incomes and Food Security: 1996-2006.

6.09 Yuko Arayama, Jong Moo Kim, and Ayal Kimhi – Identifying Determinants of Income Inequality in the Presence of Multiple Income Sources: The Case of Korean Farm Households.

7.09 Arie Leizarowitz and Yacov Tsur – Resource Management with Stochastic Recharge and Environmental Threats.

8.09 Ayal Kimhi - Demand for On-Farm Permanent Hired Labor in Family Holdings: A Comment.

9.09 Ayal Kimhi – On the Interpretation (and Misinterpretation) of Inequality Decompositions by Income Sources.

10.09 Ayal Kimhi – Land Reform and Farm-Household Income Inequality: The Case of Georgia.

11.09 Zvi Lerman and David Sedik – Agrarian Reform in Kyrgyzstan: Achievements and the Unfinished Agenda.

12.09 Zvi Lerman and David Sedik – Farm Debt in Transition Countries: Lessons for Tajikistan.

13.09 Zvi Lerman and David Sedik – Sources of Agricultural Productivity Growth in Central Asia: The Case of Tajikistan and Uzbekistan.

14.09 Zvi Lerman – Agricultural Recovery and Individual Land Tenure: Lessons from Central Asia.

15.9 Yacov Tsur and Amos Zemel – On the Dynamics of Competing Energy Sources.

16.09 Jonathan Kaminski – Contracting with Smallholders under Joint Liability.

1.10 Sjak Smulders, Yacov Tsur and Amos Zemel – Uncertain Climate Policy and the Green Paradox.

2.10 Ayal Kimhi – International Remittances, Domestic Remittances, and Income Inequality in the Dominican Republic.

3.10 Amir Heiman and Chezy Ofir – The Effects of Imbalanced Competition on Demonstration Strategies.

4.10 Nira Yacouel and Aliza Fleischer – The Role of Cybermediaries in the Hotel Market.

5.10 Israel Finkelshtain, Iddo Kan and Yoav Kislev – Are Two Economic Instruments Better Than One? Combining Taxes and Quotas under Political Lobbying.

6.10 Ayal Kimhi – Does Rural Household Income Depend on Neighboring Communities? Evidence from Israel.

7.10 Anat Tchetchik, Aliza Fleischer and Israel Finkelshtain – An Optimal Size for Rural Tourism Villages with Agglomeration and Club-Good Effects.

8.10 Gilad Axelrad, Tomer Garshfeld and Eli Feinerman – Agricultural Utilization of Sewage Sludge: Economic, Environmental and Organizational Aspects. (Hebrew)

9.10 Jonathan Kaminski and Alban Thomas – Land Use, Production Growth, and Institutional Environment of Smallholders: Evidence from Burkinabe Cotton Farmers.

10.10 Jonathan Kaminski, Derek Heady and Tanguy Bernard - The Burkinabe Cotton Story 1992-2007: Sustainable Success or Sub-Saharan Mirage?

11.10 Iddo Kan and Mickey Rapaport-Rom – The Regional-Scale Dilemma of Blending Fresh and Saline Irrigation Water.

12.10 Yair Mundlak – Plowing Through the Data.

13.10 Rita Butzer, Yair Mundlak and Donald F. Larson – Measures of Fixed Capital in Agriculture.

14.10 Amir Heiman and Oded Lowengart – The Effect of Calorie Information on Consumers' Food Choices: Sources of Observed Gender Heterogeneity.

15.10 Amir Heiman and Oded Lowengart – The Calorie Dilemma: Leaner and Larger, or Tastier Yet Smaller Meals? Calorie Consumption and Willingness to Trade Food Quantity for Food Taste.

16.10 Jonathan Kaminski and Eli Feinerman – Agricultural Policies and Agri-Environmental Regulation: Efficiency versus Political Perspectives.

1.11 Ayal Kimhi and Nitzan Tsur – Long-Run Trends in the Farm Size Distribution in Israel: The Role of Part-Time Farming